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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,582	12/19/2000	Man C. Niu	13402.00004	6349

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EXAMINER

BAUM, STUART F

ART UNIT	PAPER NUMBER
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1638

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/740,582

Applicant(s)

NIU, MAN C.

Examiner

Stuart F. Baum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15, 22, 25, 28, 29, 31, 33-36, 38, 40, 42, 43, 45, 47-50, 52, 54, 56, 59, 61, 64 and 66-73 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2000 and 01 October 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>8/30/2006</u> . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

Continuation of Disposition of Claims: Claims pending in the application are 1-11,15,22,25,28,29,31,33-36,38,40,42,43,45,47-50,52,54,56,59,61,64 and 66-73.

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DETAILED ACTION

RCE Acknowledgment

1. The request filed on 5/4/2006 for a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114, based on parent Application No. 09/740,582 is acceptable and a RCE has been established. An action on the RCE follows.

2. Claims 1-11, 15, 22, 25, 28-29, 31, 33-36, 38, 40, 42-43, 45, 47-50, 52, 54, 56, 59, 61, 64, 66-73 are pending and are examined in the present office action.

Claims 12-14, 16-21, 23-24, 26-27, 30, 32, 37, 39, 41, 44, 46, 51, 53, 55, 57-58, 60, 62-63 and 65 have been canceled.

Claim Objection

3. Claim 47 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 33. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). Both claims are drawn to corn variety 27-1.

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Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 35-41, 49-50, 52, 54, 56, 59, and 61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The rejection includes dependent claims.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term “germinating” in claims 35, 49, 56, and 61 is used by the claim to mean “that the transgenic plant somehow becomes a second generation transgenic plant”, while the accepted meaning is “the initial growth of a seed after being placed in an environment conducive for growth.” The term is indefinite because the specification does not clearly redefine the term.

Scope of Enablement

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 1-11, 15, 22, 25, 28-29, 31, 34-36, 38, 40, 42-43, 45, 48-50, 52, 54, 56, 59, 61, 64 and 66-73 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while

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being enabling for a method for producing a corn plant of variety 27-1 expressing soy globulin comprising isolating mRNA from soy cotyledons encoding said protein, microinjecting said mRNA into a seed, germinating said seed and growing said transgenic plant from said seed and wherein said plant expresses said soy globulin, does not reasonably provide enablement for a method for producing a transgenic plant which express exogenous proteins, a transgenic plant produced by said method, a method of producing transgenic corn plants expressing an exogenous protein or soy globulin, a transgenic corn plant or kernels produced by said method, said method comprising isolating mRNA from any plant or from soy cotyledons, microinjecting any seed or corn seed with said mRNA under conditions whereby said mRNA enters said seed, and growing said seed to produce a transgenic plant which produces transgenic seed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The claimed invention is not supported by an enabling disclosure taking into account the *Wands* factors. *In re Wands*, 858/F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). *In re Wands* lists a number of factors for determining whether or not undue experimentation would be required by one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claim.

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The claims are drawn to a method for producing a transgenic plant which express exogenous proteins, a transgenic plant produced by said method, a method of producing transgenic corn plants expressing an exogenous protein or soy globulin, a transgenic corn plant or kernels produced by said method, said method comprising isolating mRNA from any plant or from soy cotyledons, microinjecting any seed or corn seed with said mRNA under conditions whereby said mRNA enters said seed, and growing said seed to produce a transgenic plant, or wherein said plant produces a second generation transgenic plant which expresses said exogenous protein.

Applicant discloses isolating total RNA from soybeans, either cotyledons or sprouts and isolating polyA RNA by oligo DT chromatography. The mRNA thus isolated was adjusted to $1\mu\text{g}/\mu\text{l}$ concentration and $1\mu\text{l}$ of resulting solution was injected separately into imbibed kernels of corn, variety 27-1 and 85089 (page 9, lines 10-26; page 13, lines 3-17). Injected seeds were planted in rows and allowed to grow to maturity. A total of 134 samples were analyzed from the mRNA-treated group with 29 samples purportedly being transformed (page 14, lines 14-24; page 15, Table 1). Determination of transformation was by the presence of an additional band on a protein gel when compared to the control group (seeds not injected with RNA). The proteins were extracted from an ear's worth of seeds (page 14, lines 5-13). The Applicant also performed a Ouchterlony double agar diffusion test using an anti-soy protein serum and a Southern hybridization assay using labeled soy specific probes (page 16, lines 1-7).

The state-of-the-art teaches transformation using RNA produces unexpected results. Hansen et al (1999, Trends in Plant Science, 4(6) :226-231) teach "Successful transformation of plants demands that certain criteria be met. Among the requirements for transformation are: An

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efficient DNA delivery method” (page 227, right column, 2nd paragraph). Hansen et al continues by stating that there are a number of techniques for delivery of DNA to host cells; *Agrobacterium*-mediated transformation, biolistic or microprojectile bombardment, electroporation, polyethylene glycol treatment, or liposome treatment (page 228, left column, 2nd paragraph).

The state-of-the-art teaches using microinjection of seeds produces unexpected results. Songstad et al (1995, Plant Cell, Tissue and Organ Culture 40:1-15) teach that because of the inherent properties of plant cells, they are not amenable to microinjection as are animal cells because plant cells have a cell wall composed of thick layers of cellulose and lignin that are difficult for a glass microneedle to penetrate and plant cells vacuoles contain many hydrolases and toxic compounds that will kill a cell if the integrity of the vacuole is compromised (page 10, right column, 3rd paragraph). Due to the position of the embryo proper within the seed and the location of the meristem within the embryo, many cell layers have to be traversed by the microneedle which ruptures cells and cell vacuoles and releases hydrolases.

The Applicant has not reduced to practice the full scope of the claimed invention. The inventor does not teach how to express any exogenous protein but rather Applicant teaches how to express only the soy globulin protein. The specification discloses that total polyA was injected into the corn kernels but only the soy globulin protein was present on all protein gels analyzed. In addition, the inventor does not address what precautions must be taken to avoid RNA degradation by RNases which are ubiquitous. Lastly, the inventor does not teach how the corn kernels generate DNA which is supposedly integrated into the host genome from a RNA template; producing only one species of DNA from the population of RNA molecules isolated

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from the soy plant. As the inventor discloses in the specification, reverse transcriptase is used to generate cDNA (page 11, line 6) which transcribes all mRNA in the reaction. For one skilled in the art, it is not taught from where the reverse transcriptase originates and how one generates only one species of DNA from a population of mRNA.

The state-of-the-art teaches transforming plants with promoter-less nucleic acids produces unexpected results. Babiychuk et al (1997, Proc. Natl. Acad. Sci. 94:12722-12727) teach a gene trap procol comprising the promoter-less NPTII gene (neomycin phosphotransferase II which confers Kanamycin-resistant phenotypes) transformed into *Arabidopsis*. Babiychuk et al teach that expression of the NPTII gene only occurs when the NPTII gene is integrated into expressed regions (coding regions) of the *Arabidopsis* genome (page 12723, right column, 1st paragraph). Gai et al (2000, Nucleic Acid Research 28(1) :94-96) teach the corn genome comprises $\sim 2.3 \times 10^9$ base pairs present on 10 chromosomes which comprise 50,000-80,000 genes. The average base pair length of a gene is ~ 3 Kb which translates into 240,000Kbp's of corn genome that is partitioned into genes. The percent of corn genome designated as coding regions equals $\sim 1\%$ [240,000Kbp's of coding region/23,000,000 Kbp's of total DNA]. The inventor claims to have selected 29 transformed T1 plants from 134 kernels treated with mRNA (page 14, line 9). For the inventor to have selected 29 transformed corn plants, given the genome size and low percentage of DNA allocated to coding regions, the inventor would have to initially treat 2900 corn kernels with mRNA [(the initial number of treated corn kernels) = (the transformed kernels, 29) x (100)].

In the absence of guidance, undue trial and error experimentation would be required for one of ordinary skill in the art to work out protocols for isolating a specific mRNA from total

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RNA from any plant, microinjecting the isolated mRNA into a plant seed without having the mRNA degraded by RNases, or having the kernel damaged by the microneedle, and ensuring that the mRNA is reverse transcribed so as to be integrated into the plant genome and then finally having the DNA integrated into a position in the plant genome which facilitates transcription of the introduced DNA, so that one skilled in the art can generate any plant expressing any exogenous protein of interest.

Therefore, given the breadth of the claims; the lack of guidance and examples; the unpredictability in the art; and the state-of-the-art as discussed above, undue experimentation would be required to practice the claimed invention, and therefore the invention is not enabled.

Deposit Rejection

6. Claims 33 and 47 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Since the corn variety 27-1 claimed is essential to the claimed invention, it must be obtainable by a repeatable method set forth in the specification or otherwise be readily available to the public. If a corn variety 27-1 is not so obtainable or available, the requirements of 35 U.S.C. 112 may be satisfied by a deposit thereof. The specification does not disclose a repeatable process to obtain the exact same corn variety and it is not apparent if such a corn variety is readily available to the public.

If a deposit is made under the terms of the Budapest Treaty, then a statement, affidavit or declaration by Applicant, or a statement by an attorney of record over his or her signature and registration number, or someone empowered to make such a statement, stating that the corn variety 27-1 will be irrevocably and without restriction released to the public upon the issuance of a patent, would satisfy the deposit requirement made herein.

If a deposit has not been made under the Budapest Treaty, then in order to certify that the deposit meets the criteria set forth in 37 CFR 1.801-1.809 and MPEP 2402-2411.05, Applicant may provide assurance of compliance by statement, affidavit or declaration, or by someone empowered to make the same, or by a statement by an attorney of record over his or her signature and registration number showing that:

(a) during the pendency of the application, access to the invention will be afforded to the Commissioner upon request;

(b) all restrictions upon availability to the public will be irrevocably removed upon granting of the patent;

(c) the deposit will be maintained in a public depository for a period of 30 years or 5 years after the last request or for the enforceable life of the patent, whichever is longer;

(d) the viability of the biological material at the time of deposit will be tested (see 37 CFR 1.807); and

(e) the deposit will be replaced if it should ever become inviable.

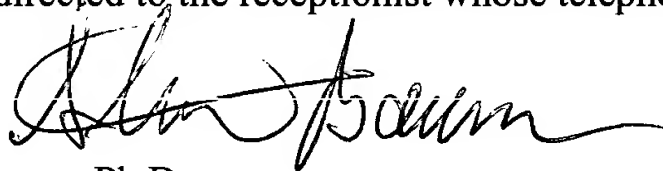
Applicant is reminded that if claim 47 is amended to be drawn to corn variety 85089, then the same requirements for deposit apply.

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7. No claims are allowed.
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart F. Baum whose telephone number is 571-272-0792. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached at 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

A handwritten signature in black ink, appearing to read 'Stuart F. Baum', with a stylized, cursive script.

Stuart F. Baum Ph.D.
Primary Examiner
Art Unit 1638
September 14, 2006